

Claims

1. Process for hydroprocessing of hydrocarbon feedstock containing sulfur and/or nitrogen contaminants, said process comprising first contacting the hydrocarbon feedstock with hydrogen in the presence of at least one first group VIII metal on a first acidic support catalyst, and thereafter contacting the feedstock with hydrogen in the presence of at least one second group VIII metal catalyst on a less acidic support.
5
2. Process according to claim 1, wherein the said hydroprocessing comprises hydroconversion, hydrocracking, hydrotreating, hydrogenating, hydrofinishing and hydroisomerization of petroleum feedstocks, such as solvents and middle distillate.
10
3. Process according to claim 1 or 2, wherein the support of the at least one first group VIII metal catalyst is selected from the group of zeolites and zeolite containing supports.
4. Process according to any of the claims 1-3, wherein the support of the at least one second group VIII metal catalyst is selected from the group of silica-alumina and other non-zeolite supports.
15
5. Process according to any of the claims 1-4, wherein the said strongly acidic support has an acidity, as defined herein, of at least 5 $\mu\text{mol/g}$.
6. Process according to any of the claims 1-5, wherein the said less acidic support has an acidity, as defined herein, of at most 10 $\mu\text{mol/g}$, with the proviso that the acidity is lower than the acidity of the support of the at least one first catalyst.
20
7. Process according to any of the claims 1-6, wherein the Group VIII metal of both the first and second catalyst have been selected, independently of each other, from the group of Pt, Pd, Ir, Rh, Ru and combinations of two or more of these elements.
25

8. Process according to any of the claims 1-7, wherein the amounts of Group VIII metal, calculated on the combined weight of the metal and the support in the first and in the second catalyst, are independently of each other between 0.001 and 2.5 wt.%.

5 9. Process according to any of the claims 1-8, wherein the volume of the at least one first catalyst is between 10 and 50 % of the total volume of the first and the second catalysts.

10. Process according to any of the claims 1-9, wherein the temperature at the inlet of the first catalyst is between 100 and 400 °C.

10 11. Process according to any of the claims 1-10, wherein the hydrogen pressure is between 0.5 and 300 bar.

12. Process according to any of the claims 1-11, wherein the organic sulfur level in the feed to the second catalyst bed is less than 500 ppm, preferably less than 50 ppm.

15 13. Process according to claim 12, wherein the organic nitrogen level in the feed to the second catalyst is less than 100 ppm, preferably less than 20 ppm.

14. Process according to any of the claims 1-13, wherein the said first and second catalysts bed are present in one reactor, or in different reactors.

20 15. Process according to any of the claims 1-14, wherein the effluent from the last of said at least one first catalysts is passed through a stripper prior to contacting it with the said second catalyst on a less acidic support.